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ABSTRACT

This guide was developed to serve as a catalyst in the design of long-range school district plans for the integration of computers into the curriculum and to assist districts in creating and controlling the direction they pursue in regard to instructional uses of the microcomputer. It raises questions, presents alternatives, and offers an opportunity for a district planning committee to design a curriculum to meet their specific needs. A description of the purposes and functions of a computer planning committee is followed by a list of questions to assist the committee in their thinking and planning. Questions fall into four categories: assessment of current usage, assessment of curriculum concerns, planning considerations, and implementation. The general scheme of developmental stages for instructional computer usage which is outlined can be restructured to reflect local concerns, capabilities, and priorities. Options or ways that computers might be used in schools are listed, applications are explained, and examples given. A format for priority ranking by individual committee members, once the various options and needs have been identified, and additional planning forms are included. (LMM)

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Instructional Computing



reaching for the future

AEA 7

A Planning Guide

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This planning guide was developed to serve as a catalyst in the designing of long-range district plans for the integration of computers into the curriculum. Since the area of computer technology is expanding at such a rapid rate, a pressing need was felt to assist districts in creating and controlling the direction they choose to pursue in regard to the instructional uses of the desk top computer.

The following guide raises questions, presents alternatives and offers an opportunity for a district planning committee to design a curriculum to meet their specific needs. The AEA 7 Instructional Computer Consultants and the Classroom Consultants offer their services to help you with this challenge.

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Purpose

It is the purpose of the computer planning committee to develop a long range sequence of activities which will organize and integrate the instructional use of computers into the existing curriculum. These activities will reflect the priorities of the school district for student learning and the needs of staff for materials, equipment, and training.

Computer Planning Committee

The Computer Planning Committee can potentially make dramatic changes for a school district. Computer knowledge is exploding at such a rapid rate that all lives are going to be affected by it in some way. A long-range Computer Planning Committee is necessary to grow with this area of technology and to make effective and efficient use of resources.

The Planning Committee needs to be representative of the school district in grade levels as well as in content areas. Administrators from several levels need to be included. It also is important to enlist the support of parents, both to maintain students in the programs and to help with funding and linkages to business and industry. Your AEA 7 Instructional Computing and Classroom Consultant can meet with the Computer Planning Committee to provide input and resources for this task.

Through the cooperative efforts of these groups and thoughtful long-range planning, a district can create and control their use of computer technology to best meet the needs of their district.

The following is a suggested list of questions to be used by a Computer Planning Committee to assist them in their thinking and planning:

Assessment of Current Usage

1. How many computers does the school have?
2. Where are they located?
3. How are they used? Are they used outside the school day?
4. What teachers are involved in their use?
5. What subject matters are involved?
6. Is there a software budget? Amount?
7. What software is presently available:
 - a. in each building?
 - b. at AEA 7?
8. What training or inservice have staff members (individuals or groups) had?
9. Is there a hardware budget? Amount?

Assessment of Curriculum Concerns

1. How familiar is the staff with possible uses of the computer for instruction?
2. What departments or grade levels are interested in making more use of the computer for instruction?
3. What specific uses do they want to make of the computer for instruction?
4. How do these uses fit in with the goals of the respective curriculum areas?
5. How effective of a method is this to assist student learning?

Planning Considerations

1. Will the present number and kind of computers owned by the district accommodate stated needs?
2. Can these needs be accomplished without the use of a computer?
3. What additional hardware is needed?
4. What additional software is needed?
5. What training is needed by staff to implement these changes?

Implementation

1. What curriculum revision will be necessary?
2. What specific software needs to be obtained
 - a. from commercial sources?
 - b. developed locally?
 - c. from AEA ??
3. What training will be needed?
4. What facility changes will needed?
5. What finances will be needed?
6. In regard to your goals and needs, what can and should be accomplished:
 - a. within the school year?
 - b. within one year?
 - c. within two years?
 - d. beyond two years?
7. What service can be provided by AEA ?? Community people?
8. Who will be responsible for the various tasks?

The following is a general scheme of developmental stages for computer usage related to instruction. These can be considered by the Computer Planning Committee. The Committee needs to examine and restructure these stages to reflect local concerns, capabilities and priorities.

1. Introduction - Elementary
 - a. Operating skills
 - b. Vocabulary
 - c. Keyboard skills
2. Exploratory - Junior High
 - a. Historical perspective
 - b. General awareness of computers
 - c. Community use of computers
 - d. Career opportunities
3. Specialization - Senior High
 - a. Beginning programming
 - b. Advanced programming
 - c. Graphics
 - d. Computer and society

OPTIONS

Ways That Computers Might Be Used in Schools

Computer Awareness:	How computers work; how they are used; computer terminology; etc.
Computer Literacy:	Learning how to use one or more computer programming languages; how to interpret computer programs and computer output; how to provide input for computer programs.
Computer and Society:	The social impact of computers; impact on jobs, the economy, individual rights, etc.
Computer Programming:	Developing the ability to carry out computer programming projects, using a variety of computer languages.
Vocational Computer Education:	Learning the skills necessary for computer related jobs.
Computer Science:	Understanding the theory of how computers work, how computer languages are designed, etc.
Computer Programming as an Aid to Problem Solving:	Computer programming used to develop cognitive abilities in problem solving, and in specific subject areas, such as math, language, social studies, etc.
Computer Simulations:	Providing simulated "environments" with which students can investigate areas of mathematics, social studies, ecology, physics, etc.
Computer Games for Teaching Logical Thinking:	Many computer games are designed to hold a user's attention and interest while teaching skills of logical thinking.
The Computer in the Laboratory:	Computers can free students from lab drudgery and permit more, better labs.

Business Applications:

Students in accounting and office occupations need to gain skills in word processing, date-base management, and automated accounting.

Programmed Instruction:

Computers are used as "teachers" which provide students with information in subject areas, give tests, and monitor student progress. Students learn at their own pace.

Computer-managed Instruction:

Computers are used to keep records of student progress in any subject area. A profile of student skills and understandings can be available to a student or teacher at any time.

Drill and Practice:

Using computers to provide routine practice in basic skills: arithmetic, spelling, etc. These programs often monitor student progress as well.

Computers are Artistic Expression:

Computers can be used for visual arts, animations, music, etc. Using computers in the arts can aid basic learning the arts as well as provide motivation for learning computer programming.

Computers as Aids to Handicapped Students:

Computers can be helpful to students who are physically, mentally, or emotionally handicapped, in a variety of modes.

Computers for Remediation:

Basic skills programs that allow students to move at their own speed in an individualized learning role.

Computers for Gifted and Talented:

Enrichment activities beyond the standard curriculum.

The above listing was taken from Microcomputers in Education: An Introduction by Adeline Naiman.

*Applications

We have been dividing the many instructional uses of computers into three categories: computer as teacher, tool, and as an object to be taught.

1. THE COMPUTER AS TEACHER (sometimes called CAI or Computer-assisted Instruction). When a computer is used as a teacher, it has been preprogrammed to determine what a student will learn. This can take many forms. Several are named below with sample programs listed.

a. Drill and Practice

Milliken Math - One segment of a K-6 sequence of math activities. This program provides for a certain amount of record keeping and "management" of instruction, as well as practice for the student. (AEA 7 Media Center.)

Caterpillar - This drill reinforces the memorization of the upper case alphabet letters in sequence. MECC - Elementary Volume 7.

Spell - This program drills on words presented randomly from a list prepared by the teacher for an individual student or groups of students. MECC - Elementary Volume 2.

b. Tutorial Programs

Programs designed to teach as well as provide practice. There are few good examples of this type of program for microcomputers. These programs tend to involve a lot of text.

Calorie Bank - This animated sequence shows a person leaving a calorie bank. It illustrates that just as one tries to get one's money's worth, one should get one's calories worth. MECC - Elementary Volume 13.

Points - This lesson defines points, lines, and line segments as they are used in geometry. MECC - Elementary Volume 8.

c. Curriculum-oriented Games

These can make practice more fun, at least for some students.

Tax-Man - A game for learning about factoring and prime numbers. MECC - Elementary Volume 1

Hurkle - Practicing the use of rectangular coordinates. MECC - Elementary Volume 1

*This section was adopted from Microcomputers in Education: An Introduction by Adeline Naiman.

d. Simulations

These game-like activities allow students to make decisions, and interact in situations that are often too complex, historical, expensive, or distant to be brought into the classroom. Students should be trained to evaluate the accuracy of simulations they use. Learning about computer modeling as a technique may be one of the most important effects of using simulations.

Oregon - Make decisions made by travelers on the Oregon Trail. MECC - Elementary Volume 6.

Civil - Pretend to be a general in the Civil War. MECC - Elementary Volume 3.

Odell Lake - Be a fish. Can you escape from your predators? MECC - Elementary Volume 4.

Buffalo - This simulation allows the user to investigate how history might have been changed if decisions different from historical ones were made and to investigate the consequences of alternative harvesting policies. MECC - Science Volume 1.

e. Logic and Problem-solving Games

This large category includes many classic games which have computer counterparts.

Bagels - A computer version of "Mastermind." MECC - Elementary Volume 1.

Calories - This program uses data collected by students on their food intake and activities during one day. It calculates the number of calories consumed and the number of calories used for activity. MECC - Elementary Volume 13.

Custom - This program is designed to estimate the annual and per acre cost of owning and operating a particular machine and to determine if it is more efficient to own a machine or to have custom work done. MECC - Agriculture Volume 1.

2. THE COMPUTER AS TOOL. Programs in this category give users some capabilities they didn't have before, making access to certain kinds of learning much easier.

a. Calculators and Statistical packages; VisiCalc (an accounting system)

b. Word Processors (for print production and for language arts)

c. The computer as a laboratory instrument, to collect, analyze, and display data and graph real-time experiments.

d. Data-base manipulation, searching.

This section was adopted from Microcomputers in Education: An Introduction by Adeline Naiman.

e. Communications Network.

F. The Computer in the Arts - PAINTER, an "artistic" program that affords another dimension to creativity. Computer music is in the same category. (High School Computer Science Project, University of Tennessee. Now published by McGraw-Hill as Computer Power.)

3. THE COMPUTER AS OBJECT TO BE TAUGHT.

- a. Programming a computer - like teaching.
- b. Problem Solving. Experiments conducted at the University of Massachusetts.
- c. The Computer as a Learning Environment - LOGO/"turtle" graphics (M.I.T.)

A word of caution: Don't lock into one mode or one instructional package. There are ways to incorporate computers productively into almost any teaching area. Look at math, business, science, but also look at language arts, social studies, special education, remedial education, music, art, and other areas that have not been considered traditional ones for computer use. Every week, new software is announced that can fit into a wide range of subject areas.

There is a tendency for schools to think of computers as only useful in computer-assisted instruction (CAI). In Congressional hearings on Information Technology in Education in April 1980, Dr. J. C. Licklider, Massachusetts Institute of Technology, pointed out that one reason that information technology has not yet led a major impact on education is that -

The basic philosophy has been incorrect - computers have been used to "push facts into students," but the approach that works best is "to use the computer...to create a stimulating learning environment and to make the computer a partner to the student in exploring and in solving problems."

This section was adopted from Microcomputers in Education: An Introduction by Adeline Naiman.

Once the various options and needs have been identified they can be priority ranked by individual members of a computer planning committee. The committee then shares and records the individual rankings to work towards a consensus upon what priority each need should be given in scheduling the implementation activities. A format such as the one listed below serves as a guide for this part of the discussion.

Committee Ranking of Stated Needs:

Once various needs have been identified, each committee member should rank them according to the order of importance.

<u>Need</u>	<u>Individual Rankings</u>							<u>Total</u>
A	_____	_____	_____	_____	_____	_____	_____	_____
B	_____	_____	_____	_____	_____	_____	_____	_____
C	_____	_____	_____	_____	_____	_____	_____	_____
....	_____	_____	_____	_____	_____	_____	_____	_____
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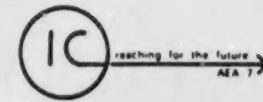
Once individual rankings have shared the committee needs to work towards consensus on areas of agreement.

Areas of agreement:

Agreas of disagreement (Please note for further discussion or consideration):

Based upon the agreed upon priority of the various needs, a timeline should be constructed. (See attached sample.)

District Plan: Hardware/Software/Application



	Year 1 1982-83	Year 2 1983-84	Year 3 1984-58
Hardware			
Software			
Application/Use			

District Plan:



TASK	IMPLEMENTATION PROCEDURES	PRIMARY RESPONSIBILITY	DUE DATE	DATE COMPLETED